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Raschle

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[54] **FALSE TWIST PROCESS AND APPARATUS**

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[30] **Foreign Application Priority Data**

Mar. 18, 1971 Switzerland 4031/71

[52] **U.S. Cl.** ..... **57/77.45**, 57/77.4, 57/157 TS

[51] **Int. Cl.** **D01h 7/92**, D02g 1/04

[58] **Field of Search** ..... 57/77.3–77.45, 57/34 HS, 157 TS

[56] **References Cited**

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[57] **ABSTRACT**

Yarn to be texturized by false twist is passed axially and sequentially through tubes, the input and output angles of the yarn in respect of the tube axes totaling between 300° and 600°.

13 Claims, 8 Drawing Figures

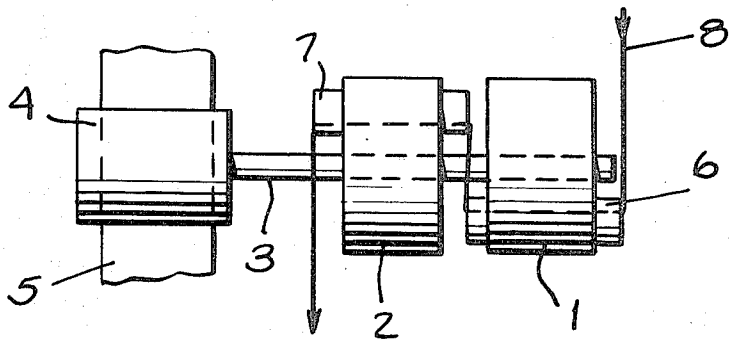


Fig. 1.

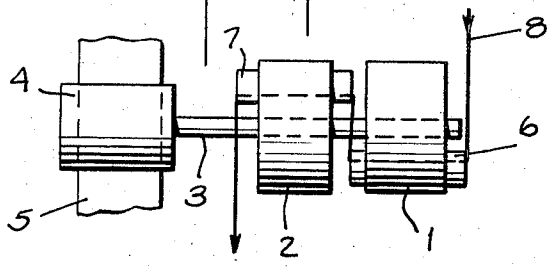


Fig. 2.

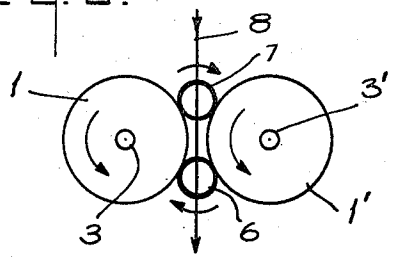


Fig. 3.

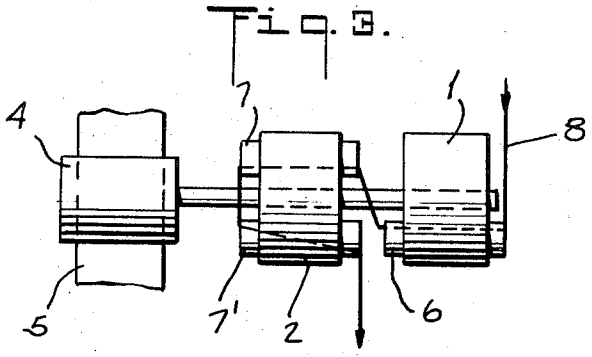


Fig. 4

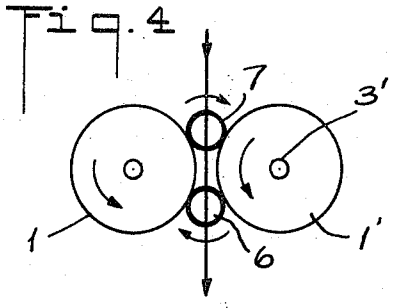


Fig. 5.

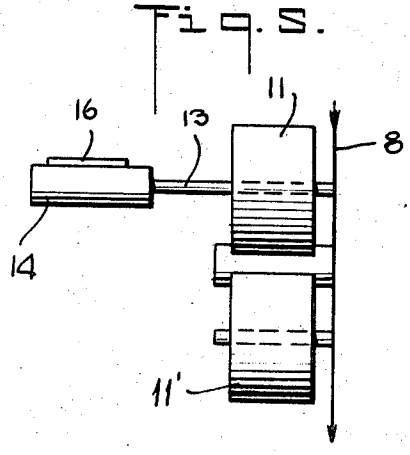


Fig. 6.

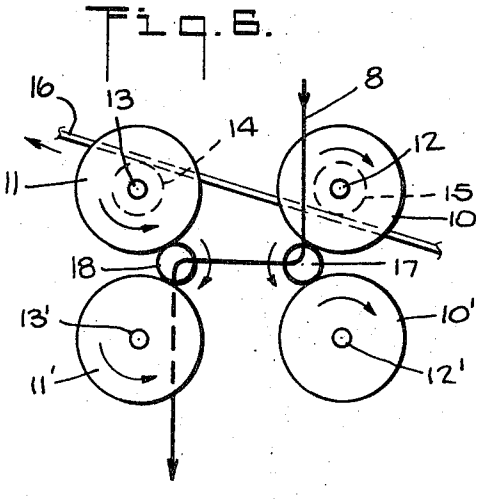


Fig. 7.

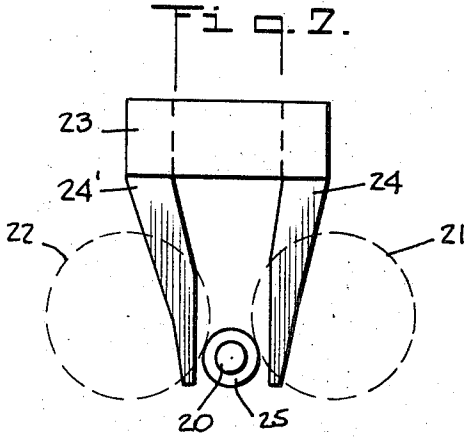
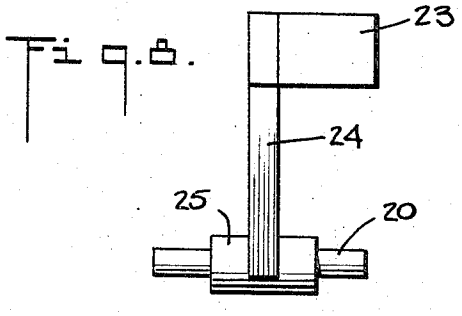


Fig. 8.



FALSE TWIST PROCESS AND APPARATUS

This invention relates to the texturing of textile yarns, and more particularly to a process and apparatus for false-twisting such yarns.

It is known to impart false-twist to textile yarns by means of rotating twist tubes. The twist tubes contain pins, edges or the like, which are so-arranged that they force the yarn passing through the twist tube to rotate with the latter. It is furthermore known to support the twist in tangential contact with axially parallel rollers and to press the same against the latter by means of magnets, the drive being effected by means of one of the rollers. Using this system, revolution speeds of the twist tubes of several hundred thousand revolutions per minute can be obtained. Illustrative references to apparatus of this type may be found in U. S. Pat. No. 3,475,895 and No. 3,518,824.

Furthermore, apparatuses have become known by means of which twist is imparted to the yarn by direct frictional contact with a moving surface. Thus, for example, a twist imparter is known which consists of a socket with widened end portions and with a smooth convex inner surface of a material with a high coefficient of friction, such as rubber. However, the use of this, as well as other rubber-like materials with a high coefficient of friction, involves the disadvantages that, while false-twisting synthetic yarns, they are subject to excessive wear so that the convex inner surface must be frequently renewed, causing many costly interruptions in machine operation.

It is the purpose of the present invention to avoid the above disadvantage and to create a process and an apparatus which permit the use of friction twist imparters with wear-resistant friction surfaces which I have found to be particularly suitable for texturing yarns of synthetic thermoplastic material.

The process of the present invention consists in passing the yarn, in sequence, through at least two friction twist tubes, which is done under input and output angles, the sum of which is between 300° and 600°. The yarn may be passed through the friction twist tubes in the same or in opposite directions, the twist tubes rotating in the same or in opposite senses.

The apparatus for effecting the process contains twist imparters which may, for example, be supported by tangential contact with axially rotatable rollers against which they are passed by means of magnets. In such an arrangement, it is preferred that two separate pairs of rollers be provided on each of which at least one friction twist tube is supported. The interior of the tubes are free of pins, edges or the like, as in the prior art. Twist is imparted by reason of the fact that the yarn bends at sharp angles entering and leaving the tubes and makes close frictional contact with the tube surfaces. The fact that the yarn contacts the friction surfaces of the friction twist tubes around a total angle of between 300° and 600° makes it possible to use friction surfaces from materials with a low coefficient of friction, but with higher wear resistance. The friction twist tubes may, for example, consist of metal oxyde ceramic material without a special inner friction surface.

There has thus been outlined rather broadly the more important features of the invention in order that the detailed description thereof that follows may be better understood, and in order that the present contribution to the art may be better appreciated. There are, of

course, additional features of the invention that will be described hereinafter and which will form the subject of the claims appended hereto. Those skilled in the art will appreciate that the conception upon which this disclosure is based may readily be utilized as a basis for the designing of other structures for carrying out the several purposes of the invention. It is important, therefore, that the claims be regarded as including such equivalent construction as do not depart from the spirit and scope of the invention.

A specific embodiment of the invention has been chosen for purposes of illustration and description, and is shown in the accompanying drawings, forming a part of the specification, wherein:

FIGS. 1 and 3 are elevational views illustrating pairs of rollers and twist tubes arranged according to the present invention;

FIGS. 2 and 4 show the apparatuses of FIGS. 1 and 3 in righthand lateral elevation;

FIGS. 5 and 6 illustrate a further type of apparatus in front elevation and in top view; and

FIGS. 7 and 8 illustrate a friction twist tube with magnetic fixation in top view and in lateral elevation, respectively.

Referring now to the drawings in detail, FIGS. 1 and 2 contemplate an arrangement involving four rollers in two pairs, only three of which 1, 1′ and 2 are shown. The axes of each pair of rollers are parallel and are arranged one behind the other. The rollers 1 and 2 are fixed on a drive shaft 3 on which a further roller 4 is arranged over which a drive belt 5 is passed. The two rollers 1′ and 2′ (the latter not shown, is behind roller 2 in FIG. 1) are fixed on another drive shaft 3′. In one cuneate throat between rollers 1, 1′, a friction twist tube 6 is supported, and this tube is pressed against the rollers by means of a permanent magnet (not shown). In one throat between rollers 2, 2′, a friction twist tube 7 is supported and is similarly pressed against the rollers 2, 2′ by meana of a permanent magnet (not shown). The yarn 8 is fed to one end of the friction twist tube 6 under an input angle of approximately 90°, passes through the twist tube and leaves it under an output angle of approximately 90°. Thereafter, the yarn 8 is fed to one end of the friction twist tube 7 again under an input angle of approximately 90° and leaves the same at the other end under an output angle of approximately 90°. The sum of the input and output angles thus amounts to approximately 360°. Since yarn 8 is passed through both friction tubes 6 and 7 axially and in the same direction, the numbers of twists imparted in the same are, therefore, added to each other.

The apparatus of FIGS. 3 and 4 differs from that of FIGS. 1 and 2 only in that friction twist tubes 7, 7′ are supported in both throats of rollers 2, 2′. The yarn 8 is fed to and through the tubes 6 and 7 in the manner described in respect of FIGS. 1 and 2, and after having left the friction twist tube 7, is fed to the friction twist tube 7′ under an input angle of approximately 90°, passes through the same axially in a direction opposite to the direction by which it is passed through friction twist tubes 6 and 7 and leaves tube 7′ under an output angle of approximately 90°. In the friction twist tube 7′, a false-twist is thus imparted to the yarn, which is opposite to the false-twist produced by the twist tubes 6 and 7. The sum of the input and output angles thus amounts to approximately 540°. This particular form of the apparatus of the invention may be used, for exam-

ple, for imparting to the yarn; after usual texturing by false-twist, a further false-twist treatment in opposite direction without heat-setting in order to prevent the formation of crinkles when the yarn is pulled off a bobbin overhead before introduction into a processing machine.

In the apparatus according to FIGS. 5 and 6, two pairs of rollers 10, 10' and 11, 11' are arranged in axial parallelism. On the drive shafts 12, 13 of the rollers 10, 11, are fixed further rollers 14, 15 over which the belt 16 runs, as shown in FIG. 6, and drives the shafts 12, 13 with equal speeds in opposite directions. The rollers 10', 11' are fixed on the shafts 12', 13'. Yarn 8 is fed to one end of the friction twist tube 17 supported in one throat of the pair of rollers 10, 10' under an input angle of approximately 90°, and is then fed to the friction twist tube 18 supported in the throat of the pair of rollers 11, 11' at approximately a right angle, passes axially through the same in opposite direction to the direction by which it passed through friction twist tube 17, and leaves the tube 18 under approximately a right angle, Since, on one hand, the friction twist tubes 17, 18 rotate in opposite directions, but the yarn, on the other hand, is passed axially through the two tubes in opposite directions, the numbers of twist imparted by these tubes are added to each other. The sum of input and output angles is again approximately 360°.

In FIGS. 7 and 8, for example, the pressing of a friction twist tube 20 against rollers 21, 22 by means of a permanent horseshoe magnet 23 is shown, The U plane of the magnet 23 is vertical, and at the ends of its legs are provided horizontal pole shoes 24, 24'. The friction twist tube 20, which may be of non-magnet material, bears an enlarged central portion 25 of magnetic material which may, for example, consist of a pack of adjacent discs of low loss sheet iron.

I believe that the construction and operation of my novel apparatus and the practice of my novel process will be understood and that the advantages thereof will be appreciated by those persons skilled in the art.

I claim:

1. A process for imparting false-twist to textile yarns in which the yarn is passed through at least two rotating friction twist tubes each supported on a pair of rotating rollers, the pair of rollers having parallel axes of rotation, said twist tubes being so arranged that the sum total of the input angles and output angles between the directions of travel of the yarn and the rotational axes of the twist tubes amounts to between 300° and 600°.

2. Process according to claim 1, characterized in that the yarn is passed axially in the same direction through friction twist tubes rotating in the same sense.

3. Process according to claim 1, characterized in that the yarn is passed axially and in opposite directions through friction twist tubes rotating in the same sense.

4. Process according to claim 1, characterized in that the yarn is passed through friction twist tubes rotating in opposite senses in axially opposite direction.

5. Apparatus for producing false-twist in textile yarns comprising at least two friction twist tubes, at least two pairs of rollers rotatable about their axes and supported to form cuneate throats therebetween, means pressing said twist tubes in the throats between said rollers, and means for driving at least one of said rollers of each pair.

6. Apparatus according to claim 5, characterized in that the pairs of rollers are arranged one behind the other and in that the rollers of each pair of rollers situated opposite one another, are fixed on the same shaft, one of which can be driven.

7. Apparatus according to claim 5, characterized in that the two pairs of rollers are arranged in axial parallelism.

8. Apparatus according to claim 5, characterized in that the means for driving said one of said rollers of each pair comprise a shaft upon which each said one of said rollers is mounted, and a further roller on each shaft over which a drive belt may be passed for rotating said further rollers.

9. Apparatus according to claim 5, characterized in that the friction twist tubes consist of metal oxyde ceramic material.

10. Apparatus according to claim 5, wherein said tubes so-arranged that the yarn to be texturized is passed sequentially through the tubes with entry and departure angles totalling between 300° and 600°.

11. Apparatus for producing false-twist in textile yarns comprising two friction twist tubes, two pairs of rollers rotatable about their axes and supported to form cuneate throats therebetween and magnetic means pressing each friction twist tube in the throats between the rollers of one of said pair of rollers, said pair of rollers being arranged one behind the other and the rollers of each pair of rollers situated opposite one another being fixed on the same shaft one of which is provided with a roller over which a drive belt is passed.

12. Apparatus for producing false-twist in textile yarns comprising three friction twist tubes, two pairs of rollers rotatable about their axes and supported to form cuneate throats therebetween and magnetic means pressing two of the friction tubes in the throats of one of said pair of rollers and the third friction twist tube in one throat of the second pair of rollers both pair of rollers being arranged one behind the other and the rollers of each pair of rollers situated opposite one another being fixed on the same shaft one of which is provided with a roller over which a drive belt is passed.

13. Apparatus for producing false-twist in textile yarns comprising two friction twist tubes two pair of rollers rotatable about their axes and supported to form cuneate throats therebetween and magnetic means pressing each friction twist tube in the throat between the rollers of one of said pair of rollers said pair of rollers being arranged in axial parallelism and each of the shafts of one of the rollers of each pair of said rollers being provided with a further roller over which a drive belt is passed driving said further rollers with equal speeds in opposite directions.

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